

XV. *Notes on Seasonal Dimorphism of Rhopalocera in Natal.* By CECIL W. BARKER. Communicated by GEORGE FRANCIS HAMPSON, B.A., F.E.S.

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SOME species of butterflies are on the wing throughout the year, whilst others appear at one season only. The seasonal variations of the double or many-brooded species are often of a very marked character, modifying the facies so considerably as to lead to much confusion in the determination of species and varieties. The Pierinæ exhibit this seasonal variation most markedly, but it is also observable among the double-brooded species of both the Nymphalidæ and Lycænidæ.

The following rules generally hold good as characteristic of the changes and modifications which occur, and which serve to distinguish the dry season form from its summer or wet season representative :—

- 1st. Smaller size and a disposition to greater acuteness in the apices of the forewings.
- 2nd. The dark markings of the upperside of wings become contracted or even obsolete. The markings of underside (especially of the apices of forewings and the whole of the hindwings) become suffused or merged in a generally duller and darker ground-colour.

Those butterflies having spots or ocelli or both, show a disposition to contraction or obliteration of those spots.

As regards those species having *recognized* varietal forms, the correctness or otherwise of the above rules is easily verified by simply first determining whether the variety in question be a dry season form or not of the species. Should it prove to be so, it is then easy to apply the principles as given above to it.

But practical field observation, during a course of years, has convinced me that many of the so-called species are simply seasonal varieties of one and

the same butterfly. It is in these doubtful cases that I hope to show how the tendencies of dry season forms to modify, according to certain fixed rules, may assist in the determination of these as either true species or varieties.

The reason for these seasonal modifications it is more difficult to understand. That in some cases the duller tints of the underside of the wings, adopted by the dry season forms, may serve for protection, is a very generally accepted opinion, and is perhaps borne out by the fact that the *Danainæ* and *Acræinæ*, protected species, either do not modify according to the season, or, where there is some such modification, it is not in favour of duller tints. Thus in *Acræa petræa*, ♀, the summer form is dark brown, whilst the dry season form is invariably red like the ♂.

Therefore, whether this change or modification of facies of dry season forms is due to protective mimicry, or whether it is the mere sympathy of organisms with their surroundings, it is beyond my knowledge or scope to determine.

Subfamily SATYRINÆ.—*Mycalesis perspicua* in the dry season form exhibits very marked contraction of some of the ocelli of the underside and the obliteration of others.

Mycalesis safitza follows the same rule, and also shows local modification of a similar kind, probably due to the drier and less luxuriant character of the country in which these modifications occur—*per exemplum*, the variety *M. evenus* (Hopff.) is alone found in the Knysna, which is the southern and western limit of this butterfly in the Cape Colony (Trimen, "South African Butterflies").

Subfamily NYMPHALINÆ.—*Atella phalantha* is on the wing both in summer and winter, and shows seasonal modifications.

Thus all the fuscous markings and spots of the upperside are contracted in the dry season examples, and they also exhibit a disposition to suffusion of the markings and spots of the underside and a duller ground-colour. *Junonia clelea* in its dry season coat adopts a duller and darker underside.

Precis cloantha exhibits attenuation of the upperside fuscous markings and a darker underside. *P. elgiva* exhibits the same tendency. *Crenis boisduvali* modifies, but in a lesser degree. *C. natalensis* ditto. *Hypanis ilithyia*,

both in the typical form and its so-called variety *archaloia* (which, I believe, is a true species), each show in their winter forms a marked change of facies. The pale orange-ochreous of the underside of the hindwings and apices of forewings, together with their spots and markings, are all suffused by a ferruginous ground-colour which, in the hindwings, encloses three macular oblique whitish bands. Intermediate or transitional forms of either species are not uncommon, about the change of the seasons, in which the suffusion of the spots and markings peculiar to the full winter form is only partially effected. *Hamanumida dædalus* affords another very striking example of attenuation of the whitish spots, and the adoption of a darker unspotted underside in the dry season forms of the species.

To illustrate the regularity of this seasonal change of facies (which, however, in *H. dædalus* occurs later than that of some of the butterflies, both in the spring and autumn of the year respectively), I have appended the following dates of capture from my notebook:—

Dec. 19th, 1889,	one ♂,	<i>Meleagris</i> form.
„ 22nd, 1889,	„ ♀,	„ „
March 30th, 1890,	„ ♂,	„ „

From the 9th to the 19th of March, 1891, I observed and captured a large series of this butterfly in the Ussatu Valley and neighbourhood of Swaziland. All these without exception were the summer or *Meleagris* form.

On my return to Malvern—

April 7th, 1891,	one ♂,	typical form.
„ 23rd, 1891,	„ ♀,	„ „

My notes also mention the abundance of this butterfly during this month (April), whereas hitherto, as far as my experience and the far larger experience of Colonel Bowker goes, it had always proved a very rare visitor to these parts. From this time up till now, Dec., 1894, the butterfly has continued prevalent throughout the year.

Further dates of capture represent only a few out of the many observed.

Dec. 12th, 1891, ♂ typical. Jan. 4th, 1892, ♀ typical.
Jan. 8th, 1892, ♂, typical. Aug. 12th, 1892, ♂, dry
season.

Aug. 22nd, 1892, ♂, dry season. Sept. 17th, 1892, ♂,
dry season.

Sept. 9th, 1892, ♀, dry season.

November, 1892, *H. dædalus*, dry season form still
plentiful.

January, 1893, wet season form of *H. dædalus* fairly
plentiful.

June and July, 1893, observed *H. dædalus* dry season
form fairly prevalent at Black Umvelosi River,
Zululand.

On return to Malvern—

Aug. 29th, 1893, one ♂, dry season.

Oct. 23rd, 1893, one ♀, dry season.

Nov. 14th, 1893, one ♀, dry season.

Charaxes ethalion, as well as some others of the Natal
Nymphalidæ, modify seasonally, but sufficient examples
of this family have been brought forward to illustrate
the tendency of seasonal transition, according to the
principles given above.

Such of the *Lycænidae* that appear at both seasons of
the year show considerable differentiation in their
summer and winter forms. Thus the winter examples of
Lycæna lucida are smaller and have the spots of the
underside more or less contracted or obliterated.
Some species, vide *Lycæna cissus* and *Lycæna barkeri*,
are modified by the spots and markings of the underside
showing so faintly as to be scarcely distinguishable from
the ground-colour.

It is, however, among the genera *Terias*, *Pieris*, and
Teracolus, of the subfamily *Pierinæ*, that seasonal
differentiation is most conspicuous and has caused the
greatest errors and confusion in the definition of species.

The number of species recognized by Mr. Trimen,
F.R.S., etc., for the Extra-Tropical limit of South Africa,
of the genus *Terias* is seven.

Careful observations of their habits during a course
of seasons, and bearing in mind the tendency of seasonal
forms to adopt certain fixed rules of differentiation,
would dispose me to reduce this number from 7 to 4,

viz., (1) *T. zœ* = *T. brigitta*, (2) *T. butleri* = *T. æthiopica*, (3) *T. floricola*, (4) *T. regularis* = *T. desjardinsii*.

The intimate relationship of *T. zœ* to *T. brigitta* has been remarked upon by Colonel Bowker, F.Z.S., etc., as far back as the year 1863, and in the April of that year he records the capture in Brit. Kaffraria of a ♂ *T. zœ* in cõp. with a ♀ *T. brigitta*. During the changes of the season such instances of the copulation of the two forms are not infrequent, and I have noticed that generally the ♂ or ♀ of the pair is of a slightly modified or transitional form of either *T. zœ* or *T. brigitta*.

On the coast districts of Natal the true *T. zœ* is only on the wing during the summer or wet season, and *T. brigitta* during the late autumn and winter only. Numerous transitional or modified *T. zœ* to *T. brigitta* forms keep up the sequence between them during the change of the seasons.

The seasonal modification of *T. zœ* to *T. brigitta* is quite according to the rules upon which I lay so much stress, i.e., the attenuation of the black markings or borders of the upperside, and the adoption of a darker tint to the underside.

T. butleri is a rare form on the Natal coast, and *T. æthiopica* by no means common. All my examples of *T. butleri* have been caught during the summer months, and my *T. æthiopica* in the autumn or winter.

The following are some dates of capture of *T. butleri* and *T. æthiopica* for the year 1889-90.

<i>T. butleri.</i>	<i>T. æthiopica.</i>
Feb. 12th, 1889.	May 13th, 1889.
Dec. 9th, „	June 4th, „ pr. in cõp.
Dec. 10th, „	April 24th, 1890.
Feb. 1st, 1890.	May 30th, „
March 31st, „	July 1st, „

Judging by their general facies and the fact of their following one another seasonally, and that they comply with the same principles of modification, as cited in previous cases, I am strongly of the opinion that *T. æthiopica* is only the dry season variety of *T. butleri*.

Identically the same conditions point to the probability of *T. desjardinsii* being the dry season form of *T. regu-*

laris, and with the additional force, that being a common butterfly I have had greater opportunities of watching it throughout the year. Transitional forms from *T. regularis* to *T. desjardinsii* are also common.

Pieris saba has its recognized variety (*Flavida*, Grandier), which, to the best of my knowledge, is also seasonal; it being a rare winter form. The ♂ of this variety, which is not described in "South African Butterflies," Trimen, is on the upperside similar to the summer form, except in its smaller size, acuter apices of forewings, and absence of the black nervular spots of the hindmargins of the hindwings. The underside is tinted, of a similar colour to that of *P. saba*, ♂. I have three recorded captures of the ♂ *Flavida* as follows—May 25th, 1890, July 27th, 1890, and Aug. 25th, 1890, also one ♀, May 8th, 1890.

Pieris pigea is a purely summer or wet season form, being replaced by *P. alba* in the winter or dry season. Transitional forms occur between the seasons, which exhibit a gradual approximation to *P. alba*, by the attenuation of the nervular black spots of the hindmargins of the upperwings and in the ♀, also of the discal spot of the forewings. *P. alba*, ♂, on the upperside is devoid of all the nervular black spots of hindmargins of wings, common to *P. pigea*, and on the underside has the apices of the forewings and the whole of the hindwings tinted. *P. alba*, ♀, has two distinct forms; one which exhibits the same tint of underside as the ♂, and the other exhibits a rich orange-ochreous underside to hindwings and apices of forewings. Everything points to the probability of *P. alba* being the dry season form of *P. pigea*.

For similar reasons I believe *P. charina* to be the winter, or, at least, seasonal form of *P. simana*, though I have, unfortunately, kept no notes of dates of capture of this butterfly to refresh my memory. However, I have certainly caught *P. charina* in the driest months of the year, and my captures of the typical *P. simana*, I am equally certain, have all been during the summer months, say from December to February. Intermediate forms, if such they be, with more or less slight irroration of the underside, I have met with both during these months, and more frequently during the autumn. These approximate dates, I am aware, do not agree with some referring

to the capture of these species in the Cape Colony, but local conditions and difference of climate may give very different results in districts widely separated. Thus in Natal, for instance, certain species of butterflies are on the wing along the coast belt long before the appearance of their congeners in the upper districts.

Instances also occur of certain butterflies being double-brooded in one locality, whereas in another (with presumably less favourable conditions of existence), the same species only appears once a year.

According to the rules which I have adopted, the smaller size and ferruginous tinting of the underside of *Pieris gallenga* (H. G. Smith), would point to its being a winter form of *Pieris spilleri*. I caught *P. gallenga* plentifully in the Umvelosi Valley, Zululand, during July and August, 1889, but on the Natal coast *P. spilleri* itself is a late autumn and early winter butterfly, as these dates of capture for the year 1890 will show:—

April 9th, one ♂ and two ♀s. June 1st, one ♂, and June 8th, one ♂.

These dates point, as I have already said, to its being an autumn or early winter butterfly; but, on the other hand, last season, in the last week of February, I caught one of the large light variety ♀ of *P. spilleri* at the Karkloof, and Mr. Hutchinson, at the same time and place, two more ♀s of this variety. Strange to say, I do not remember observing any of the typical *P. spilleri* ♂ or ♀ on the wing at the same time.

It is quite possible that in the warm valleys of the Umvelosi there may be a regular summer and autumn brood of *P. spilleri*, and that *P. gallenga* succeeds it in the late winter. It is also probable that the two forms of *P. spilleri* and *P. gallenga* succeed one another similarly in Natal; but it is a rare fly in this part of the world, and has not, therefore, been much observed, except at the season when it is most in evidence.

Pieris gidica to *Pieris abyssinica* affords me one of the best illustrations of seasonal differentiation, for if circumstantial evidence be worth anything, one should have no doubts as to the relationship of the two butterflies. Both *P. gidica* and *P. abyssinica* are common butterflies along the Natal coast, and I have given them much attention.

Mr. Trimen, in his "South African Butterflies," is disposed to regard *P. abyssinica* as a local variety of *P. gidica*, were it not for the rarity of the former. Rarity certainly does not apply to it, in this locality, for in the winter season it is nearly as plentiful as *P. gidica* is during the summer months. *P. gidica* is on the wing throughout the summer, and is succeeded with seasonal regularity by *P. abyssinica* in the winter, intermediate forms being fairly numerous during the change of the seasons. These intermediate forms show all the fuscous markings of the underside of *P. gidica*, in more or less suffused brown instead of black, but having the light yellow ground-colour only slightly affected by a duller tint. The upper part of the discoidal cell, which remains as a conspicuous whitish streak in *P. abyssinica*, is also unaffected in the intermediate forms, except that the black streak bounding the lower parts of the cell of *P. gidica* has changed also to brownish, and has become somewhat broadened and suffused. In the typical *abyssinica* the whole ground-colour has changed to brown, leaving only a whitish streak (still more contracted than in the intermediate form by the widening of the brown line of lower side of discoidal cell) from base through discoidal cell. The nervules and other markings peculiar to *P. gidica* are all shown in a darker shade of brown to that of the ground. I have also witnessed several cases of copulation of *P. gidica* with *P. abyssinica*, or with the intermediate forms. This, of course, only occurs about the change of the seasons, when, generally, old worn ♀s of the one kind are taken possession of by the early hatched ♂s of the other.

Pieris severina also modifies seasonally, and is otherwise variable. The winter form has the nervules of the underside hindwings strongly defined in black, and has a dull greyish ground-colour to same. The black borders of the upperside are narrower than in the summer form, and in some ♂ examples the white spots of the hindmarginal border of hindwings are hardly enclosed. The late spring and early summer form retain the black clouded nervules of the underside, but the ground-colour between is light yellow instead of grey. A third form, which I have generally noticed as occurring in mid-summer, has very broad borders to upperside, often in the ♂ almost obliterating the hindmarginal spots of the

hindwings, and the underside of the hindwings is almost, or quite, without nervular black clouding, and shows a clear ground of bright yellow. The variety *boguensis* is not, I believe, peculiar to any season of the year. Out of these seasonal variations some Lepidopterists have coined the usual number of spurious species, *P. agripina*, etc.

The seasonal and local variations of *Herpænia eriphia* have afforded our authorities sufficient grounds for the prevailing infatuation of species-mongering. Thus the winter form of *H. eriphia* has been transformed into *melanarge* (Butler),* though the only distinctions that can be claimed for it are a slightly more ochreous colour, with attenuation of dark markings on the upperside, and a reddish suffusion about the apices of forewings and hindwings of underside. These are, in fact, the usual modifications which I am trying to demonstrate as peculiar to dry season forms. I caught a large series of the variety *melanarge* in Zululand during the month of July, 1893, and have received specimens of the type caught in Werner County for me during the summer time.

Teracolus eris is another excellent illustration of the same rules of seasonal differentiation. The variety A ("South African Butterflies," Trimen) differs from the typical form in the slightly less heavily-marked upperside, and in the reddish tinting of the underside. I caught numerous specimens of the variety A in Zululand in July, 1893, and a single ♂ of the same variety up the Pungwe River, Mozambique Province, in September, 1894.

Teracolus ione is a rare insect in this locality, the variety A of Trimen being the only form of it I have met with. Mr. A. Millar has caught examples at Sydenham, near Durban, in the autumn and early winter, the ♂s of which exhibit considerable contraction of the black markings of the upperside, and absence of the nervular hind-marginal spots of hindwings.† I also caught two similarly marked ♂s up the Pungwe River in September, 1894. These specimens approximate very closely to

* Mr. Barker has, however, examined *H. melanarge* since writing the above, and admits that it is a distinct race from the S. African form, both forms of which stand in the British Museum under the name of *H. eriphia*.—G. F. H.

† The underside of hindwings is lightly freckled with grey irrorations.

Teracolus phlegyas, which is, I believe, exclusively a winter form.

Teracolus speciosus affords examples of every gradation from the typical form down to *T. jobina*, which is, I believe, undoubtedly the winter form of it. *T. jobina* is alone met with in the winter or dry season, though forms intermediate between it and *T. speciosus* are prevalent in the late autumn or between the seasons.

T. regina typical is evidently the winter form of this butterfly, and the variety A of Trimen (since metamorphosed into *T. anax*, H. G. Smith) is the summer form of it. My personal knowledge of this butterfly is limited to the capture of a small ♂ in the Umvelosi Valley, Zululand, in July, 1893, and of a ♀ up the Pungwe River in September, 1894. Both these are of the dry season or typical form. I have also examples of the variety A = *T. anax*, and of the typical form from Mashonaland sent to me on different occasions. I have every reason to believe that *Teracolus wallengrenii* is the dry season form of *T. annæ*. *T. annæ* is plentiful about Sydenham, near Durban, and Mr. A. Millar has collected long series of this butterfly throughout the year. His examples graduate from the heavily-marked typical *T. annæ* to the intermediate form variety A of Trimen, and thence to the true *T. wallengrenii*. *Teracolus wallengrenii* he has alone taken in the winter months, and then sparingly. In Zululand, in the valleys of the Black and the White Umvelosi Rivers, I have captured *T. wallengrenii* numerous on two different occasions, i.e., in August of 1889, and in July, 1893. *Teracolus annæ* is alone caught in the summer months, though the variety A occurs somewhat rarely in the autumn.

The same reasoning points to *T. topha* being merely the seasonal variety of *T. auxo*. In Natal and Zululand *T. auxo* only occurs in the summer, and *T. topha* in the winter, though intermediate forms are occasionally met with about the change of the seasons. In July, 1889, I took *T. topha* numerous at different points all along the road from the Umgani River to the Tugela River, and going over the same ground, in December, 1890, I took *T. auxo* just as numerous at the same places. Again, in my next trip, about the end of June, 1893, *T. topha* was alone in evidence, and as numerous

as ever. Mr. Mansel Weale's testimony of the occurrence of *T. topha* at King William's Town, throughout the summer (from January to May, 1876), and of this species being replaced the following summer (from end of 1876 to end of April, 1877) by *T. auxo* is, in the light of my experience in Natal, difficult to account for. It however appears that *T. auxo* is at its furthest limits westwards in Brit. Kaffraria, and that it only occasionally puts in an appearance, being almost exclusively replaced by the allied form *T. topha*. It has already been mentioned in this paper that as regards *Mycalesus safitza*, the variety *evenus* (Hopff.), which represents our winter form of this fly, alone is met with at the Knysna. The Knysna represents the furthest limits westwards of *M. safitza* = *M. evenus*, as Brit. Kaffraria represents the western limit of *T. auxo* = *T. topha*, and in each the winter forms of the respective species are alone prevalent. But *T. auxo* is reported to have occurred near King William's Town in 1877 in abundance.

It is difficult to account for this occasional appearance of the Natal summer form *T. auxo* in Brit. Kaffraria, but cases do occur frequently (presumably in seasons favourable to such reversion), of forms peculiar to certain localities, showing marked differentiation towards allied forms of other localities. *Per exemplum*, *Papilio brasidas*, a common fly in Natal, shows, in some seasons, a marked disposition to approximate to its allied form *Papilio leonidas*, and on the 7th of December, 1894, I captured a ♀ *P. leonidas*, which in the size and greenish colouring of the spots, could not be separated from the most pronounced type of Tropical Africa.

Papilio morania shows the same inclination, in certain seasons, towards its allied form *P. corinneus*. *P. morania* and *P. brasidas* are the local semi-tropical modifications of *P. corinneus* and *P. leonidas* respectively, and under favourable conditions of seasons there is a constant inclination to reversion towards the facies of their Tropical representatives. Similar causes may have produced analogous results as regards the occasional reversion in Brit. Kaffraria of *T. topha* to the *T. auxo* form, of the more humid semi-tropical eastern districts.

Mr. Mansel Weale bred the larvæ and pupæ of both *T. auxo* and *T. topha*, and found them identical in

appearance and habits, evidence which alone ought to be sufficient to substantiate their identity as one species.

Teracolus evenina.—I have had little personal experience of the habits of this fly, but judging by the description alone of variety A, Trimen (*T. deidamoides*, Aurivillius), with its reduced development of the black markings of the upperside and tinted irrorated underside, I should have little hesitation in concluding it to be the dry season form of the type. My only two captures of *T. evenina*, var. A, are one ♂ at Johannesburg, in November, 1887, and one ♀ up the Pungwe River, in September, 1894.

Teracolus achine, *T. gavis*a, and *T. antevippe*, I have the strongest grounds for believing to be specifically identical. *T. gavis*a is probably a local form of *T. achine*, and takes the place of the former in the more luxuriant semi-tropical localities of the south-eastern coast belt. *T. achine* is itself rarely met with upon the Natal coast, and many forms, intermediate between *T. achine* and *T. gavis*a, are also fairly prevalent in the spring and summer. *T. gavis*a, during the summer months, is one of our commonest flies upon the Natal coast, and continues with transitional forms, approximating it to *T. antevippe*, till the autumn or change of the seasons. It is then succeeded in the winter or dry season months by the typical *T. antevippe*.

I retain in my collection eleven specimens under the heading *T. gavis*a, and twelve under that of *T. antevippe*, to illustrate the gradations of the one form to the other and some of the variations, seasonal and local, of *T. antevippe* itself.

As the summer advances into autumn, examples of *T. gavis*a exhibit contraction of the width of the black bordering of the apices of the forewings, and of the other fuscous markings of the upperside, especially as regards the width of the longitudinal bands of fore and hindwings. On the underside the black neuration does not extend so far towards the base, and inclination is shown to slight freckling about the apices of the fore and over the disc (especially near base) of the hindwings, but still leaving the whitish ground unaffected by a darker tint.

Later on in the season the apices of the forewings and disc of hindwings on the underside become tinted, and

the striolations and freckling more defined. In some examples the nervules near the hindmargins are still clouded with blackish. On the upperside the longitudinal black bars of the ♂s have nearly, or quite, disappeared, leaving only some fuscous clouding about base, and the ♀s show a much contracted width of these bands and of the other fuscous markings.

From this stage it becomes difficult to tell where *T. gavis* ends and *T. antevippe* begins. Still later on in the season, August and September particularly, the ♂ examples of *T. antevippe* are generally smaller, with a disposition to greater acuteness of the apices of the forewings; the apical bordering is narrower on the outside and almost obsolescent on the inside. The nervular spots of the hindmargins, hindwings have become mere faint streaks, and on the underside the apices of the forewings are freckled throughout and show no pale orange suffusion along the inner portion. The hindwings also are more densely freckled. The ♀s of this form generally show a brighter orange or yellow apical patch. The ♂s and ♀s of this late winter form approximate very closely to the corresponding sexes of *T. simplex*. The number of species recognized by some of our authorities, which these above-described seasonal variations have given rise to, is *legion*—too numerous to comment upon individually in this paper.

During the change of the seasons I have often come across intermediate forms *in cōp.* with either *T. gavis* or *T. antevippe*, or with slight modifications of the one or the other.

To describe the transitions of *T. omphale* to *T. theogene* would be a mere repetition of the above, for they exhibit, with seasonal regularity, every gradation of the one form into the other, and are also equally common flies on the Natal coast. To give dates of capture of the different transitional examples of these common butterflies would also be superfluous, as so many, yearly, come under my observation.

There can be but little doubt that *T. antigone* is the winter form of *T. phlegetonia*. Both forms are somewhat local, but wherever *T. antigone* is found in the winter, there you may be equally sure of finding *T. phlegetonia* in the summer. Intermediate forms, connecting the two so-called species, are not uncommon. I caught

T. phlegetonia plentifully at the Lower Tugela in December, 1890, and on the same hillside in August, 1889, and again, in July, 1893, I found it replaced by *T. antigone*.

The extraordinary variations in the ♀s of *T. antigone* have also given great scope to the prevailing furor for species-manufacturing. These variations of the ♀s appear to be quite arbitrary, depending on neither season nor locality exclusively, for I have caught many different forms at one and the same place, and at the same time. The ♂s, strange to say, hardly show any variation beyond the seasonal modifications connecting them with *T. phlegetonia*.

The winter form of *T. vesta*, var. A of Trimen (*T. argillaceus* of Butler), is yet another excellent illustration of the tendency of seasonal forms to modify according to well-defined rules. There is the usual attenuation of the markings of the upperside and the suffusion with reddish of the apical area of the forewings and the whole of the hindwings of the underside. The following dates are illustrative of the seasonal character of this differentiation:—

August, 1889, I caught numerous specimens of var. A., *T. vesta*, at the Lower Tugela. At the same place in December (early) I caught many of the typical form, and a few intermediate between typical and var. A.

Again, in July, 1893, I caught and observed at the same place var. A only.

I could supplement these dates by other instances in other times or places, but as all the cases which have come under my observation bear out the contention that variety A is the winter form of *T. vesta*, it is unnecessary to do so.

Eronia cleodora also has a well-defined late season form. It differs from the typical, or wet season form, in its smaller size, much narrower black borders to the wings on the upperside, and on the underside the adoption of a darker, more ochreous colour on the disc of the hindwings, and of the orange mark near apex of the forewings.

Eronia buquetii also modifies seasonally, the winter form being devoid of the blackish apical bordering of forewings, this being replaced by a faint narrow brownish edging, in some examples hardly observable. The irroration of the underside of the hindwings is also more

defined upon a generally duller greenish ground. *Eronia leda* is no exception to the same rules for winter forms. The dry season brood show a narrower border to apices of forewings, and are generally smaller in size than the summer brood. The orange of the underside is deeper in colour, and the flecking of the hindwings denser.

I have noticed no marked seasonal differentiation among the *Papilioninæ*. *P. demoleus*, which appears more or less throughout the year, shows generally rather smaller during the dry season months, but I know of no other variation.

This brings me to the end of my theme, as I have not sufficient data to do justice to such seasonal changes as may occur amongst the obscure family of the *Hesperiidæ*.

My only ambition has been to lead Lepidopterists to turn more of their attention to the very marked seasonal differentiation which nearly all butterflies exhibit that fly throughout the year. The collective testimony of a large number of Natal butterflies differentiating seasonally, on certain well-defined principles, ought to bear due weight in the determining of doubtful species. This identification of species can best be aided by paying the utmost attention to dates of capture, with due regard to the character and climate of the country the butterfly may come from.

As regards the *Pierinæ*, any butterflies showing a strongly-tinted underside, with or without freckling, I should feel inclined to attribute to a dry season, or modified form of some wet season congener yet to be identified.

There may, doubtless, be exceptions to this ruling, especially as regards butterflies living in dry, arid countries, where the conditions of existence are no more favourable to perfect development than the winters of more luxuriant countries.

In conclusion, I can only add that the present system of adding species to species, on the mere ground of some slight modification of the markings of the upper or underside, and sometimes on the strength of one or two examples, is most misleading. Even as regards such slight structural differences as the lesser or greater comparative length of the radial nervules, one to the other, due weight should be given to the tendency of dry season forms to adopt acuter forewings, which must manifestly affect the relative proportions of these nervules.

There are three important examples of seasonal variation in the family *Nymphalidæ*, which, since writing my notes, I find I have inadvertently omitted to mention. The first of these, *Melanitis leda*, belongs to the subfamily *Satyrinæ*, and the other two, *Precis tugela* and *Salamis anacardii*, to the subfamily *Nymphalinæ*. Each of these three species show, in their late season (late summer and autumn) forms, a very marked prolongation of the apices of the forewing, both outwardly and downwards. This projection, in the early season broods, is in each case much modified or blunted, and is not produced downwards. They are also smaller, and show contracted but better-defined markings to both upper and undersides. It is curious that these three species, generically distinct, and, in the case of *M. leda*, belonging to a different subfamily, but possessing in common this marked prolongation of the apices of the forewings, should all modify seasonally on similar lines.

